

QICN Position Statement:

Periurethral cleaning agents used prior to IDC insertion

What does the evidence state about periurethral cleaning agents prior to indwelling urinary catheter (IDC) insertion?

There is strong, emerging evidence (Mitchell et al., 2021, Cao et al., 2018, Fasugba et al., 2017, Fasugba et al., 2017) to suggest recommending 0.1% chlorhexidine gluconate for periurethral cleaning prior to IDC insertion to reduce CAUTI, and additionally provide a cost-savings (Mitchell et al., 2019) to HHS.

What agents are commonly used by clinicians in Queensland?

Queensland HHS guidelines, procedures and policies identified on QHEPS found the following agents are currently in use:

- Antiseptic agents such as 0.1% Chlorhexidine 30mg / 30 mL.
- Non-aseptic cleaning agents such as Normal Saline 0.9% or sterile water.
- Any other agent as requested by medical officer (e.g., povidone iodine).
- “Reducing CAUTI Survey” disseminated to clinicians involved in IDC care across Queensland. HHS identified soap and water is used for periurethral cleaning before IDC insertion.

What relevant guidelines, policies and procedures or strategy documents are available?

JBI and Cochrane electronic databases were searched for systematic reviews on cleaning agents (non-antiseptic and antiseptic) used prior to IDC insertion.

Current guidelines for the prevention of CAUTIs recommend using an aseptic approach for insertion of indwelling urinary catheters

- Each Queensland hospital or health service has a guideline, policy, or procedure available to clinicians on QHEPs stating the cleaning agent to be used for periurethral cleaning before IDC insertion and may recommend aqueous chlorhexidine 0.1%, normal saline 0.9% or other agent as requested by medical officer.
- Mitchell, B et al., 2011 ASIC (HICSIG)/AICA Position Statement: Preventing catheter-associated urinary tract infections in patients' Healthcare infection 16(2):45-52 <https://www.sciencedirect.com/science/article/pii/S1835561716301375>
- HICPAC (2010) does not recommend antiseptic cleaning (Grade 1B evidence), European (2008) antiseptics not recommended (Grade A evidence) SHEA/IDSA (2009) not recommended (A1 evidence) <https://doi.org/10.1071/HI11007>
- Australian Guidelines for the Prevention and Control of infection in Healthcare, Canberra: National Health and Medical Research Council 2019 recommend using sterile normal saline prior to IDC insertion and state "the evidence underpinning this suggestion is currently inconclusive" (Table 24, page 165) nhmrc.gov.au/sites/default/files/documents/infection-control-guidelines-feb2020.pdf
- Catheterisation Clinical Guidelines – ANZUNS 2013 clean with cleansing solution according to your local guidelines https://www.anzuns.org/wp-content/uploads/2015/03/ANZUNS-Guidelines_Catheterisation-Clinical-Guidelines.pdf
- Healthcare Infection Control Practices Advisory Committee (HICPAC) guideline for prevention of catheter-associated urinary tract infection states further research is needed on the use of antiseptic solutions vs. sterile water or saline for periurethral cleaning prior to catheter insertion (No recommendation/unresolved issue) (Key Question 2C) <https://www.cdc.gov/infectioncontrol/guidelines/cauti/recommendations.html#II>
- National evidence-based guidelines for preventing healthcare-associated infections, UK, National Institute for Health and Care Excellence (NICE) 2013 (update 2017) Healthcare-associated infections: prevention and control in primary and community care Clinical Guideline [CG139] 1.2.4.3 states the meatus should be cleaned before the catheter is inserted, in accordance with local guidelines/policies <https://www.nice.org.uk/guidance/cg139/chapter/1-guidance#long-term-urinary-catheters>
- Loveday, H.P et al 2014 epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England the Journal of Hospital Infection 86 (1): 1-70 Expert opinion indicates that there is no advantage in using antiseptic preparations for periurethral cleaning prior to insertion and recommends sterile normal saline (Class D evidence, studies from 1983, 2010). <http://www.journalofhospitalinfection.com/action/showPdf?pii=S0195-6701%2813%2960012-2>

- Infectious Diseases Society of America (IDSA) guide to preventing CAUTI (2014) states they do not recommend antiseptic cleaning prior to insertion. No evidence levels are listed. <https://patientcarelink.org/wp-content/uploads/2015/11/APIC-Guide-to-Preventing-CAUTI-May-2014.pdf>
- European Association of Urology nurses 2012 Catheterisation Indwelling catheters in adults – Urethral and Suprapubic and recommends not to cleanse with 0.05% chlorhexidine gluconate (LE: 1a) or using povidone iodine to wash genital area (LE: 3) to prevent CAUTI <http://nurses.uroweb.org/guideline/catheterisation-indwelling-catheters-in-adults-urethral-and-suprapubic/>

What do Queensland guidelines recommend regarding cleaning agents before insertion of urinary catheters?

All Queensland HHS guidelines, policies and procedures vary within their recommendations for cleaning agents to be used for periurethral cleaning prior to IDC insertion.

Antiseptics (such as chlorhexidine, povidone-iodine) have antibacterial effects. There is emerging evidence to suggest the antiseptic agents, chlorhexidine gluconate is superior to povidone-iodine (betadine) and provides additional cost savings to health services by reducing CAUTI incidence. Non-antiseptics (sterile water, normal saline) are cheaper.

Limitations of the evidence

- The majority of RCTs recommending non aseptic cleaning agents provide low quality evidence due to methodological flaws, and low powered RCTs.
- Type of IDCs used in RCT needs to be described (e.g., antibiotic coated nitrofurazone coated and silver alloy-coated IDCs, latex, or silicon control IDCs).

Study, Author and Year	Methodology	Findings/Outcomes	Recommendations/Limitations
<p>Mitchell, B., Curryer, C., Holliday, E., Rickard, C. M., & Fasugba, O. (2021). Effectiveness of meatal cleaning in the prevention of catheter-associated urinary tract infections and bacteriuria: an updated systematic review and meta-analysis. <i>BMJ open</i>, 11(6), e046817. https://doi.org/10.1136/bmjopen-2020-046817</p>	<p>-SR (18 studies- RCTs & quasi experimental studies) & meta-analysis.</p> <p>-povidone-iodine vs standard (n=2)</p> <p>-green soap vs routine meatal care (n=1)</p> <p>-antibacterial agent vs routine care (n=4)</p> <p>-chlorhexidine vs tap water (n=2)</p> <p>-povidone iodine vs soap and water (n=3)</p> <p>-chlorhexidine vs normal saline (n=1)</p> <p>-povidone iodine vs normal saline (n=1)</p> <p>-povidone iodine vs sterile water (n=2)</p> <p>-povidone iodine vs tap water (n=1)</p> <p>-chlorhexidine vs non antimicrobial cloth (n=1)</p>	<p>-- Potential benefit of reducing bacteriuria by using antiseptics including chlorhexidine and povidone-iodine (OR 0.84, 95% CI 0.69 to 1.02; p=0.071).</p> <p>-Antiseptics (chlorhexidine or povidone-iodine) may be of value for meatal cleaning on the incidence of CAUTI, compared with comparator agents (saline, soap or antimicrobial cloths) (OR=0.65, 95% CI 0.42 to 0.99; p=0.047).</p>	<p>-Emerging evidence for the role of chlorhexidine for periurethral cleaning prior to IDC insertion.</p> <p>-Potential benefit to the role of antiseptics more generally reducing bacteriuria.</p> <p>-Limited studies using CAUTI as the primary outcome, further studies are required.</p>
<p>Cao, Y. Zhizhong, G. Shan, J & Gao, Y (2018) Comparison of the preventative effect of urethral cleaning versus disinfection for catheter-associated urinary tract infections in adults: A network meta-analysis https://doi.org/10.1016/j.ijid.2018.09.008</p>	<p>-SR (31 RCTs and 3 quasi experimental trials). n=6490 (adult patients)</p> <p>-iodine vs tap water (n=13).</p> <p>-chlorhexidine vs tap (n=6).</p> <p>-antibacterial use vs routine care (n=4)</p> <p>-iodine vs saline (n=3)</p> <p>-iodine vs soap and water (n=3).</p> <p>-iodine vs routine care (n=1).</p> <p>-chlorhexidine vs saline (n=1).</p> <p>-iodine vs chlorhexidine (n=1).</p>	<p>-Iodine vs. routine meatal care OR 1.19 (95% CI, 0.75 to 1.86 [P = 0.46])</p> <p>-Iodine vs. tap water OR 0.75 (95% CI, 0.51 to 1.10 [P = 0.14])</p> <p>-Iodine vs. saline o OR 1.10 (95% CI, 0.60 to 2.02 [P = 0.77])</p> <p>-Iodine vs. soap and water OR 0.88 (95% CI, 0.48 to 1.61 [P = 0.69])</p> <p>-Iodine vs. chlorhexidine o OR 0.36 (95% CI, 0.09 to 1.44 [P = 0.15]) -</p> <p>Antibacterial vs. routine meatal care o OR 0.74 (95% CI, 0.55 to 1.00 [P = 0.05])</p> <p>-Chlorhexidine vs. tap water o OR 1.09 (95% CI, 0.69 to 1.71 [P = 0.72]) -</p> <p>Chlorhexidine vs. saline OR 1.16 (95% CI, 0.32 to 4.30 [P = 0.82])</p>	<p>--No differences amongst different urethral cleaning versus disinfection methods for CAUTI.</p> <p>-Chlorhexidine may prove to be significant urethral cleaning. Large powered RCTs that demonstrates the efficacy of chlorhexidine to prevent CAUTI.</p>

		<p>-Soap and water vs. routine meatal care OR 1.59 (95% CI, 0.85 to 2.96 [P = 0.15].</p> <p>-In the Bayesian analysis, chlorhexidine ranked first, clean water ranked second, soap and water ranked third, and the other methods (iodine, saline, routine meatal care, and antibacterial use) ranked from 4 to 7.</p>	
<p>Huang, K., Liang, J., Mo, T., Zhou, Y. & Ying, Y (2018) Does periurethral cleaning with water prior to indwelling urinary catheterisation increase the risk of urinary tract infection? A systematic review and meta-analysis American Journal of Infection Control 46: 1400-1405 http://doi.org/10.1016/j.ajic.2018.02.031</p>	<p>-SR (5 RCTs) & meta-analysis. n=822 (adults and paediatric patients)</p> <p>-Water (sterile or tap water) vs chlorhexidine)</p> <p>-Water (sterile or tap water) vs povidone-iodine.</p>	<p>- No statistical significance in UTI incidence between the water group and antiseptics group (RR, 1.07; 95% CI, 0.77-1.49; P = .89; I² = 0%).</p> <p>-Available data comparing water with povidone-iodine or chlorhexidine gluconate demonstrated no significant difference between the incidence of UTIs (RR, 1.10; 95% CI, 0.66-1.83; P = .79; I² = 0%; and RR, 1.05; 95% CI, 0.68- 1.62; P = .72; I² = 0%; respectively).</p>	<p>-Tap water and sterile water effective for meatal cleaning prior to IDC insertion in the community or hospital setting.</p> <p>--Small study size, definitions of UTI in included studies varied in colony count.</p> <p>-Further large, powered RCTs are needed to determine if water is safe as other topical antiseptics.</p>
<p>Fasugba, O., Koerner, J., Mitchell, B. G., & Gardner, A. (2017). Meatal cleaning with antiseptics for the prevention of catheter-associated urinary tract infections: A discussion paper. <i>Infection, disease & health</i>, 22(3), 136–143. https://doi.org/10.1016/j.idh.2017.06.004</p>	<p>-Discussion paper-Guidelines and clinical practice recommendations: *National evidence-based guidelines for preventing healthcare-associated infections in national health service hospitals in England *Australasian Society for Infectious Disease (ASID), ASID Healthcare Infection Control Special Interest Group (HICSIG) and Australian Infection Control Association (AICA) position statement. * Australian guidelines for the prevention and control of infection in healthcare.</p>	<p>-Guidelines differ in their recommendations for meatal cleaning prior to insertion.</p> <p>-Overall results showed no benefits of using an antiseptic over a non-antiseptic agent. The p value for the use of antibacterials versus routine care for meatal cleaning in the prevention of CAUTI was close to the significance threshold of 0.05 (P Z 0.055).</p>	<p>-Close to recommending antibacterials to prevent CAUTI.</p> <p>-Inconclusive findings were acknowledged by flaws in methodological studies and by insufficient sample size to detect a clinically relevant difference.</p> <p>-Larger, powered RCTs are needed to determine if antiseptic cleaning agents can be recommended, and to provide a consensus for the guidelines.</p>

	<p>*Healthcare Infection Control Practices Advisory Committee (HICPAC) guideline for prevention of catheter-associated urinary tract infections.</p> <p>*Society for Healthcare Epidemiology of America (SHEA) and Infectious Diseases Society of America (IDSA) practice recommendation.</p> <p>*European and Asian guidelines on management and prevention of catheter-associated urinary tract infections.</p>		
<p>Fasugba, O., Koerner, J., Mitchell, B. G., & Gardner, A. (2017). Systematic review and meta-analysis of the effectiveness of antiseptic agents for meatal cleaning in the prevention of catheter-associated urinary tract infections. <i>The Journal of hospital infection</i>, 95(3), 233–242. https://doi.org/10.1016/j.jhin.2016.10.025</p>	<p>-SR and meta-analysis (11 RCTs and 3 quasi-experimental studies).</p> <p>-Povidone iodine vs routine care, povidone iodine vs soap and water, povidone iodine vs normal saline, povidone iodine vs water</p> <p>-Chlorhexidine vs water</p> <p>-Green soap and water vs routine care.</p>	<p>- No difference in the incidence of CAUTIs when comparing antiseptic and non-antiseptic agents (pooled OR 0.90, 95% CI 0.73–1.10; $P=0.31$) or when comparing different agents</p> <p>-Comparison of different agents:</p> <p>povidone-iodine vs routine care ($P=0.46$); povidone-iodine vs soap and water ($P=0.69$); chlorhexidine vs water ($P=0.89$); povidone-iodine vs saline ($P=0.76$); povidone-iodine vs water ($P=0.74$); and green soap and water vs routine care ($P=0.15$).</p> <p>Comparison of an antibacterial agent vs routine care indicated near significance ($P=0.055$).</p> <p>Comparison of an antibacterial agent with routine care indicated near significance ($P=0.06$).</p>	<p>-Emerging evidence for the use of antiseptics prior to IDC insertion.</p> <p>-Larger, powered RCTs are needed to determine if antiseptic cleaning agents can be recommended and for generalisability findings.</p> <p>-Alcohol may be a possible confounding factor in the efficacy of alcohol-containing antiseptic agents and requires further assessment further.</p>

		- No evidence of statistical heterogeneity in the meta-analysis (studies were clinically heterogeneous with regards to diversity in the patient groups, intervention types and microbiological definitions of the outcome).	
Cooper FPM, Alexander CE, Sinah S, Omar MI. Policies for replacing long-term indwelling catheters in adults. Cochrane Database of systematic Reviews (2016) Issue 7. Art. No: CD0111115. https://doi.org/10.1002/14651858.CD011115.pub2	SR (3 RCTs) n=107 (adults) Water vs chlorhexidine for periurethral cleaning at day 7 of IDC placement.	-There was no statistically significant difference in the incidence of ASB or CAUTI for short term replacement (up to 14 days). There was no statistically significant difference in the incidence of asymptomatic bacteriuria at 7 days (RR 0.80, 95% CI 0.42 to 1.52). -Reporting of the trials was inadequate, and the risk of bias assessment was judged to be unclear for most domains in two out of three trials. -There was no statistically significant difference in the rates of ASB or CAUTI for short term replacement (up to 14 days). There was no statistically significant difference in the incidence of asymptomatic	-No -Smaller, underpowered trials used in analysis. - Larger, powered RCTs are needed to determine if antiseptic cleaning agents can be recommended.
Cunha, M., Santos, E., Andrade, A., Jesus, R., Aguiar, C., Marques, F., Enes, F., Santos, M., Fernandes, R., & Soares, S. (2013). Effectiveness of cleaning or disinfecting the urinary meatus before urinary catheterization: a systematic review. https://doi.org/10.1590/S0080-623420130000600023	SR and meta-analysis (5 RCT) n=743 (adults) Cleaning agents include povidone-iodine, chlorhexidine, and sterile water.	-Cleaning or disinfection of the urinary tract prior to bladder catheterisation does not present statistically significant difference, since there is no difference in the acquisition of UTI	-Small, underpowered trials used in analysis. - Larger, powered RCTs are needed to determine if antiseptic cleaning agents can be recommended.

		(OR=1.07, 95%CI=0.68-1.68, p=0.779).	
<p>Mitchell, B. G., et al. (2019) Chlorhexidine versus saline in reducing the risk of catheter associated urinary tract infection: A cost-effectiveness analysis. International Journal of Nursing Studies 97: 1-6 https://doi.org/10.1016/j.ijnurstu.2019.04.003</p>	<p>Cost-effectiveness study based on 32- week stepped wedged RCT</p>	<p>-Switching from saline to 0.1% chlorhexidine per 100,000 catheterisations would save hospitals AUD \$387,909 per 100,000 catherisations, prevent 70 cases of CAUTI, release 282 bed days and provide a small improvement in health benefits of 1.43 quality adjusted life years. Using a maximum willingness to pay for a marginal quality adjusted life year threshold of AUD\$28,000 per 100,000 catherisations.</p>	<p>-Adopting chlorhexidine is cost-effective and potentially reduces morbidity and mortality rates.</p>